tech briefs

Westinghouse Savannah River Company

Human Factors Engineering Analysis Tool

at a glance

- Automates guideline selection
- Uses a graded approach
- Increases efficiency and consistency of analyses
- Enables multiple users to perform simultaneous analyses
- Tracks status of analyses
- Copyrighted

for more information

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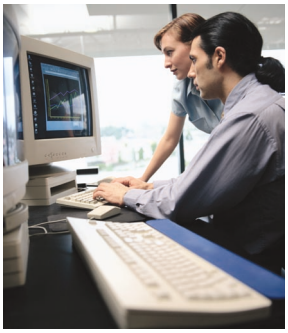
Software selects guidelines, facilitates analyses



A new software tool enables the easy and quick selection of applicable regulatory guidelines as a starting point for human factors engineering (HFE) analyses. Once selected, each guideline can be viewed on screen. The software tracks and reports the status of HFE analyses and may be accessed simultaneously by multiple users.

Background

One of the human factors engineering standards used in the design of human-system interfaces for process control systems at the Savannah River Site is NUREG 0700, "Human-System Interface Design Review Guideline," issued by the Nuclear Regulatory Commission (NRC). NUREG 0700 includes over 1,650 distinct guidelines. NRC provides a software tool, the Design Review Guide, to assist in the NUREG 0700 guideline analysis process. However, the burden for selecting which of the 1,650 guidelines are applicable to a given process is placed on the user. Manual selection of appropriate guidelines can be tedious. It also can lead to inconsistencies among analyses due to different user preferences or interpretations.

Guidelines are presorted by applicability

In developing the Human Factors Engineering Analysis Tool (HFE-AT), a team of HFE subject matter experts reviewed and categorized all 1,650+ NUREG 0700 guidelines.

The guidelines were sorted into the following categories:

- System technical applicability (computer based or noncomputer based).
- System functional applicability (safety basis or non-safety basis).

The guidelines also were sorted by the following types:

- General concept: Highest level or most general description of a topic that is common to two or more guidelines.
- Supporting detail: Guidelines that address specific details associated with general concepts.
- Stand-alone: Any other guideline that is sufficiently important to be considered individually.

Graded approach used to select guidelines

The selection of type is dependent on the selection of category. For example, supporting detail guidelines will only be selected for safety basis analyses. This system default mode can, however, be overridden by the user who may view and select specific supporting details for non-safety basis analyses.

The user also can enter specific user-defined guidelines in addition to the preloaded guidelines.

As an example of its inherent efficiency, the HFE-AT software consistently selects only 620 of the NUREG 0700 guidelines as a starting point for typical analyses involving computer-based, non-safety basis process control systems.

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Human Factors Engineering Analysis Tool

Tracks HFE analyses

Once the guidelines are selected, the HFE-AT software allows the user to view each selected guideline to analyze compliance of the process control system, structure, or component with the guideline. The user then clicks one of the following status option buttons to record the results of the analysis:

- Not Statused
- Hold
- Discrepancy – Analysis Required
- Not Applicable
- Discrepancy – Use As Is
- Compliant

The user can record comments and/or attach electronic documents to support the selected status. For example, a dispositioned nonconformance report can be attached to support a status of "Discrepancy – Use As Is."

Multiple users can access HFE-AT over a network to expedite guideline reviews.

Extra features are user friendly

An automated guideline status report displays the total number of applicable guidelines by type and the number of reviewed guidelines by status option.

Additional features include a keyword find function and a handy dictionary. Clicking on any underlined word will bring up a definition of the word.

System requirements

An IBM compatible PC with Microsoft Windows 95 or higher is required to run the application. At least 32 MB of RAM and 100 MB of storage are required to enable multiple analyses to be saved.

The HFE-AT software tool employs a Microsoft Access relational database and provides a Microsoft Visual Basic user interface.

Partnering opportunity

The HFE-AT software tool is copyrighted by Westinghouse Savannah River Company (WSRC). WSRC is seeking parties interested in licensing HFE-AT and selling it as a commercial product. Although designed to facilitate human factors engineering analyses in compliance with NUREG 0700, the HFE-AT data engine also could be applied to other data sets. Only a one-time data categorization effort would be required for any new data sets.

Interested companies will be requested to submit a business plan setting forth company qualifications, strategies, activities, and milestones for commercializing this invention. Qualifications should include past experience at bringing similar products to market, reasonable schedule for product launch, sufficient manufacturing capacity, established distribution networks, and evidence of sufficient financial resources for product development and launch.

Technology transfer

WSRC is the managing contractor of the Savannah River Site for the U.S. Department of Energy. WSRC scientists and engineers develop technologies designed to improve environmental quality, support international nonproliferation, dispose of legacy wastes, and provide clean energy sources. WSRC is responsible for transferring technologies to the private sector so that these technologies may have the collateral benefit of enhancing U.S. economic competitiveness.

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